Claims

We claim:

1   1. A system for organizing and accessing a database, the system comprising:

2   a primary B+tree index;

3   a secondary B+tree index;

4   a plurality of mapping table row identifiers stored in the secondary B+tree index; and

5   a plurality of database addresses for leaf blocks of the primary B+tree index

6 corresponding to mapping table rows.

1   2. The system according to claim 1, wherein 4 bytes of the database addresses are stored

2 in the secondary B+tree index.

1   3. The system according to claim 1, wherein the database addresses correspond to a

2 guess-database address.

1   4. The system according to claim 1, further comprising:

2   a guess-database address quality statistic for the secondary index and a guess-database

3 address quality statistic for the mapping table, both statistics being operable to assess guess-

4 database address quality.

1   5. A method for managing a database system, the method comprising:

2   creating a secondary index for a B+tree structure, wherein the secondary index structure

3   comprises a plurality of rows each comprising an index key value, a mapping table rowid value

4   and a guess-database address value.

1   6. The method according to claim 5, further comprising:

2   inserting a row of the secondary index structure, wherein inserting the row comprises

3   inserting a row comprising an index key value, a mapping table rowid value and a guess-

4   database address value.

1   7. The method according to claim 5, further comprising:

2   deleting a row of the secondary index, wherein deleting the row comprises locating a row

3   comprising an index key value and a mapping table row identifier and deleting the row.

1   8. The method according to claim 5, further comprising:

2   updating the secondary index, wherein updating the secondary index comprises locating a

3   row of the secondary index comprising an old index key and a mapping table row identifier,

4   deleting the row and inserting in the row a new index key value, a mapping table row identifier

5   and a guess database address.

1   9. The method according to claim 5, further comprising carrying out a query utilizing the

2   secondary index, wherein carrying out the query comprises:

3   utilizing a guess-database address stored as part of a secondary index row to find a row in

4   the primary B+tree structure;

5   obtaining a target database block from the row in the primary B+tree structure;

6   searching the target database block for a row that contains a mapping table row identifier

7   that is the same as a mapping table row identifier stored in the secondary index row; and

8   if the row in the database block matches the target database block, then the correct row in

9   the database has been located and the query is completed.

1   10. The method according to claim 9, wherein if the row in the database block does not

2   match the target database block, carrying out the query further comprises:

3   accessing the mapping table row stored in the secondary index row;

4   utilizing a guess-database address stored in the mapping table row to access a target block

5   of the database;

6   searching the target block for a primary key that matches a primary key stored in the

7   mapping table row; and

8   if the primary key is found, then the query is completed.

1   11. The method according to claim 10, wherein if the primary key is not located carrying

2   out the query further comprises:

3   traversing the primary B+tree structure utilizing the primary key value from the mapping

4   table row to identify the database address to complete the query.

1   12. The method according to claim 11, further comprising:

2   maintaining a guess-database address quality statistic for the secondary index;

3   maintaining a guess-database address quality statistic for the mapping table;

4   utilizing the statistics to assess guess-database address quality; and

5   carrying out the query based upon guess-database quality in the secondary index and

6 mapping table.

1   13. The method according to claim 12, further comprising:

2   estimating guess-database address quality;

3   estimating the cost of the query based upon the estimated guess-database address quality;

4 and

5   carrying out the query starting with an index structure with the lowest estimated cost.

1   14. The method according to claim 5, wherein only 4 bytes of the guess-database address

2 value are stored in the secondary index row.

1   15. A computer program product for performing a process of managing a database system,

2 comprising:

3   a computer readable medium; and

4   computer program instructions, recorded on the computer readable medium, executable

5 by a processor, for performing the steps of:

6   creating a secondary index for a B+tree structure, wherein the secondary index structure

7 comprises a plurality of rows each comprising an index key value, a mapping table rowid value

8 and a guess-database address value.

1   16. A system for performing a database management process, comprising

2   a processor operable to execute computer program instructions; and

3   a memory operable to store computer program instructions executable by the processor,

4   for performing the steps of:

5   creating a secondary index for a B+tree structure, wherein the secondary index structure

6   comprises a plurality of rows each comprising an index key value, a mapping table rowid value

7   and a guess-database address value.